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ABSTRACT

This study focuses on the differences in operating costs between the traditional 180-day school schedule and the 45/15 year-round schedule in the Bethel School District of Tacoma, Washington. Two approaches were used to identify and analyze costs of the following: building administration, teachers, secretaries, clerks and aides, instructional specialists, food service, transportation, custodians, maintenance, libraries, utilities, central administration, and instructional support. Model I was designed to investigate differences in cost per pupil in all categories before and after the year-round program was implemented. Model II was used to calculate the costs that would be incurred if the 45/15 plan was ended and the traditional schedule made operational. No differences were determined in Model I. In Model II, cost differences were found to be related to the alternative used to provide needed school space and services. (Author/LD)

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AN ANALYSIS OF OPERATIONS COSTS UNDER TRADITIONAL AND YEAR-ROUND STUDENT SCHEDULES IN THE BETHEL PUBLIC SCHOOLS

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Although many others have contributed to this work, I must, of course, assume full responsibility for the content of this report.

D.R.F.

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SECTION I: INTRODUCTION

Statement of the Problem

The Bethel School District has operated schools on a year-round schedule since 1973-74. The particular schedule used in Bethel has been the 45-15 plan. Only students in elementary and junior high school use the 45-15 plan; high school students use the traditional nine month schedule. The 45-15 plan requires that students be divided into four groups. Each of the groups attends school during a 45-day quarter and then each group "goes on vacation" during a 15 day break. Because attendance for each group is staggered, only three of the four groups attend school during any particular quarter; a fourth group is always on vacation. For example, in a school of 600 students, there would be four groups of 150 students each. Three of the groups, or 450 students, would attend school at any particular time; a fourth group of 150 students would be on vacation. An illustration of the Bethel schedule appears in Appendix A.

Because one quarter of a student population is on vacation at any particular time, there is clearly a reduced need for educational space. The traditional schedule requires 33 percent more student stations than the 45-15 schedule. In a school district with a stable student population, the reduction would be permanent. In a school district with an increasing student population, capital outlay for new school space would be delayed and reduced. Clearly the 45-15 plan reduces the need for capital outlay which results in a savings to the district. There is a question, however, about the costs to operate schools on the 45-15 plan. Is there a difference in operating costs between

schools using the 45-15 plan and schools using the traditional nine-month schedule? This question has served as a focus for this study.

Objective of the Study

To address this research question, the following specific objectives were identified:

1. Using the F-196 reports from Bethel and similar school districts for the past several years, expenditures will be analyzed to determine in which budget categories 45-15 schools appear to be different.
2. Using a simulated model of the Bethel School District on a traditional schedule, budgetary comparisons will be made between the Bethel School District on a 45-15 schedule and the simulated Bethel School District budget on a traditional schedule. These questions will be addressed:
    a. Do schools operating on the 45-15 plan save money for operations cost?
    b. What budgetary elements, if any, cost more?
    c. What budgetary elements, if any, cost less?
3. Using information from comparisons of actual and simulated budgets, the cost of returning the Bethel School District to a traditional schedule with equivalent service levels will be determined.

To achieve these objectives, the following general tasks were identified:

1. Complete an orientation to the Bethel School District
2. Review all appropriate literature, including dissertation abstracts, periodicals, and other publications
3. Develop appropriate models to analyze operational costs
4. Collect data related to costs in the Bethel schools and other schools
5. Interpret data and present conclusions.

Each of these tasks is discussed in the following pages. A description of the Bethel School District is presented in this section. The review of literature appears in Section II. Section III describes the models and procedures used. Section IV presents results of the analysis. Section V draws conclusions and suggests additional research.

An Orientation to the District

The Bethel School District is located southeast of Tacoma, Washington, near the Fort Lewis Military Base. According to the 1970 census, there were 19,744 residents in the Bethel attendance area. Of this population, 8,547 were over 25 years of age and 57.6% of these were high school graduates. The median family income was $9,008 and there were 9.3% of the families below the poverty level. The Bethel District has 18% of its labor force employed in professional and managerial work. As of December 1, 1977, there were 7,181 students enrolled in the district making Bethel the 30th in size, based on enrollment, of the 304 Washington school districts. Encompassing 220 square miles, the district transports 70% of its students by bus, a total of 3,427 miles each day of operation.

There are six elementary schools, two junior highs and one high school at this time; additional schools are being constructed. The elementary and junior high schools are in the 4th year of a 45-15 plan for year-round schools. Over the past seven years, the Bethel School District has been the second fastest growing system in the state of Washington. In 1963-64, there were 3,126 students enrolled. In 1978-79, there were 7,573 students expected.

The Bethel District involves citizens in making significant decisions about its schools. The citizens have indicated satisfaction with the year-

round program and with the districts' achievement of its overall goals. Fourth grade test scores (1977) showed students scored above the national average on the total battery. Students scored at or above national norms on each subtest.

The elementary program offered in the Bethel school system is relatively consistent from building to building, even though the enrollments and buildings themselves vary greatly from each other. All children have the opportunity for special services from a reading teacher, speech therapist and music teacher. Hot lunches are available to all children. Roy and Lacamas Elementary schools receive food in hot and cold "packs" while the other schools serve lunch from a central kitchen. Students operate on an approximate 9:00-3:00 schedule with a ten minute recess in the morning, an hour lunch period for eating and noon recess, and a ten minute afternoon recess. The specific schedule for each building is individual and teachers customarily choose the beginning and ending times of their day. Teachers supervise students during morning and afternoon recess periods and classified staff members are commonly used at noon.

Teacher aides are used in every building with emphasis on teacher support activities, such as secretarial tasks, rather than on direct involvement with student learning. Exceptions are in the remedial reading and remedial math areas where aides are working directly with students. Certified staff members also work in the resource rooms or as library aides where they are directly involved with children. All buildings use classified staff as office personnel and cafeteria personnel.

In each building a health clerk is used to maintain health records for students and to deal with minor problems (headache, sore throat, etc.) which may require parents' attention.

The Bethel Recreation Association provides activities for children at the elementary schools. A teacher is compensated $50 a year for building coordination of the activities. School buildings are used by the Association three to ten hours a week. All buildings are used by other community organizations an average of 10-12 hours a week.

The oldest buildings, Roy and Elk Plain, were built in 1937; the newest, Thompson, was built in 1970. The buildings house 500-600 at a given time (Roy/Lacamas 250) with a total school enrollment of 650-800 (Roy/Lacamas 300). Total elementary school enrollment as of December 1, 1977 was 3,770 in six elementary school units. The building styles range from Roy with wood floors and a bell tower to Thompson and Spanaway with carpet and open-space construction. Three buildings have portables used for classrooms.

The teachers work day is seven and one-half hours and principals estimated that teachers work two hours per day beyond that. There was disagreement as to whether teachers took advantage of the three weeks vacation for refreshment as they did the summer break. Several administrators mentioned teachers participating in school activities on their vacation time.

Principals report their work day to be 8-10 hours with an average of 9 hours a day. They all spoke of frustration at the lack of "down time," time spent at work without children in the building. Several said they were exhausted after working four years with the 45-15 plan. One spoke of the principals requesting from the Board a longer break for rest or study. One spoke to the positive effect of putting paper work on a more evenly spaced schedule as opposed to large amounts being done before and after the school year. Another spoke to the frustrations of dealing with the volume of student turnover at their school; the enrolling and scheduling of students takes time. All mentioned the positive attitude of the community toward the year-round

program and one showed a recent "report card" on the program received from parents which was very positive. Several principals spoke to the elimination of the "May syndrom" with teacher energy and morale remaining at a good level throughout the year. One principal found the issue of communication with total staff, one quarter of which is out of the building at any one time, unmanageable. Another spoke to several creative accomodations for this problem.

Bethel Junior High and Spanaway Junior High School are very similar in program, staff utilization, and number of students. As of December 1, 1977, Behtel had 923 students enrolled and Spanaway had 915 students enrolled, grades 7-9. The buildings were built for 550 and 700 respectively and currently house approximately 700 students at any given time. Bethel was built in 1958 and serves the southern area of the district. Spanaway was built in 1970 and serves the northern area of the district. Both buildings have two portables. Bethel uses one for economics and one for General Music. Spanaway uses one for football storage and one for shop. The shop facilities is planned for remodeling which would make it a permanent structure.

Both junior high schools operate a six hour day for students with a thirty minute lunch; teachers do not supervise students during lunch. Academic periods and lunch are 50 minutes long.

Classified personnel are used primarily for clerical and other similar responsibilities. Aides spend direct instructional time with students only in Title I math and reading programs. Both buildings have a guidance office clerk, a health aide, a library aide, and a laundry room person. Both schools use classified personnel to supervise the lunch room. Students have only enough time to eat and pick up materials for afternoon classes as no organized activities or special use of the building occurs at noon.

Teachers are assigned duties for hall and bus supervision as well as for supervision of special school events. No compensation is provided. Duty rotates so that no teacher has the same responsibility all year and each teacher has a fair amount of duty. Some teachers also supervise a club or sports activity and these teachers receive extra compensation by district agreement.

Both school principals estimated that at least sixty percent of the students participate in an extracurricular activity during the year. Four sports seasons are offered with segregated activities for boy and girls: football/volleyball, wrestling/basketball, basketball/gymnastics, baseball/softball, and track for both boys and girls. Both junior high schools participate in the Bethel Recreation Program, a locally organized and operated community league. An activity bus runs Monday and Wednesday at 3:30 for club members and an athletic bus runs at 5:00 for sports participants.

Principals at Bethel and Spanaway Junior High Schools see their work day as an 8 to 9½ hour day. They estimate that teachers work approximately one and a half hours per day beyond their contracted day.

The teaching staff is divided into "tracking" and "multi-tracking" staff. Tracking teachers follow the 45-15 schedule and vacation with a block of students following the same schedule. Multi-tracking teachers teach special subjects and may opt for any length contract--15 to 230 days. Multi-track teachers take days off by scheduling with the building principal.

Both principals notice the loss of "down time," time without students and staff in the building. They both commented on the loss of a long break and alluded to a requested change in schedule by the district allowing for time away from the job.

SECTION II: REVIEW OF LITERATURE

To investigate previous research of year-round schools, the following sources were used: (1) ERIC documents, (2) dissertation abstracts, (3) periodicals. (4) materials published by school districts, and (5) related books. The preponderance of this material deals with program issues that are not related to costs of year-round plans (e.g., the relationship between year-round schools and student achievement, attitudes, community acceptance, difficulties with scheduling, et al.). Of those works that deal with costs of year round-schools, most studies focus on savings of capital outlay. It is clear that year-round schools reduce or delay capital expenditures. However, as Shephard and Baker state,

> The affect of year-round schools on operating costs is more complex. Although most schools experience an overall increase in operating costs when changing to year-round schools, the experience of schools that have managed to reduce operating costs suggest that a five percent reduction in operating costs is a reasonable expectation. Certain costs categories will yield savings in year-round schools while other costs will increase. On balance, it seems as if a slight reduction in operating costs per pupil can be achieved for those budget items that are invariably and necessarily affected by year-round schools. However, the final impact on operating costs is determined by other changes made for convenience sake during implementation of year-round schools, or by improper planning.[1]

The complexity of cost analyses of year-round schools is readily observed from the few studies that are reported in the literature. The primary issues are:

(1) identifying and including all cost categories that may be affected by changing schedules--either <u>from</u> a year-round plan or <u>to</u> a year-round plan.

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[1]Shephard, Morris A. and Keith Baber, <u>Year-Round Schools</u> (Lexington, Mass: D.C. Heath and Company), 1977, page 65.

(2) Measuring cost categories in a valid way so that when differences in cost categories are identified, those differences can truly be attributed to the difference in schedules.

(3) Assuming that the same number of students--district wide--will be served under any plan that is investigated.

(4) Assuring that equal levels of services are provided under all plans investigated.

The importance of each of these issues will be addressed as the following pertinent studies are discussed.

Dr. William Volk, of the State Department of Education in New Jersey, studied the operating costs of Lanes Mill Elementary School on two different schedules;[1] one was the traditional 180 day schedule, the other was a 45/15 schedule. For his study, Volk identified the following costs for investigation: 1) administration, 2) secretarial, 3) instructional staff, 4) support staff, 5) general services, 6) fringe benefits, 7) instructional supplies, 8) maintenance, 9) custodial supplies, 10) utilities, and 11) transportation and related services. Volk illustrates the impact on costs when varying levels of service are provided under different schedules. He emphasized that specific levels of service must be identified before costs are associated with programs under the two schedules. Using the assumptions stated in his plan, Volk was able to identify a cost savings of $17.26 per pupil for the 45/15 schedule during the 1973-74 school year.[2] This cost benefit is related to operation costs only and is contingent on achieving a reasonable balance in scheduling students over four quarters of the 45/15 plan. Volk

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[1]Volk, Dr. William A., "An Analysis of Differences in Costs Among Three (SIC) School Year Schedules for Lanes Mill Elementary School" (Brick Town Township Public Schools--Mimeo), 1975.

[2]Ibid., page 26.

states further that this benefit maybe eroded by selecting or rejecting various options that have an influence on the benefit.[1]

The Virginia Beach, Virginia, public schools began operating four elementary schools on the 45/15 year-round plan during the school year 1973-74. One year later a study was conducted to determine potential cost benefits if all other elementary schools were converted to the 45/15 plan.[2] The expected savings for this conversion were based on the actual operational costs of the four elementary schools that were converted for the 1978-74 school year. Costs included in the analysis were 1) instructional staff, 2) new instructional space, 3) support staff, 4) new support space, 5) maintenance, 6) textbook rental, 7) public information, 8) unique capital outlay. A summary of the total projected costs in these cost categories is provided in Table 1.[3] As can be seen from Table 1, the costs for the two schedules

TABLE ONE

SUMMARY PER PUPIL COST COMPARISON: 1973-1979

	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
All programs 45/15 Calendar	610.13	718.22	748.48	832.08	895.55	10.39
All Programs Regular Calendar	617.80	720.74	742.76	829.96	891.05	12.34
Difference (45/15 Minus Regular)	$-7.67	$-2.52	$ 5.72	$ 2.12	$ 4.50	$-1.95

[1]Volk, Dr. William A., "An Analysis of Differences in Costs Among Three (SIC) School Year Schedules for Lanes Mill Elementary School" (Brick Town Township Public Schools--Mimeo), 1975, p. 26.

[2]Costs Analysis II (Virginia Beach, Virginia, Public Schools), 1975.

[3]Ibid., page 3.

are virtually the same. The authors once again emphasize that these cost differences depend upon selection of a particular level of service to the schools.

When considering cost categories, one must be certain to include all costs categories that may represent different costs under the schedules being investigated. Although the Boeing Company, in a recent study for the Lake Washington School District, [1] was able to determine significant savings for the year-round schedule, the Boeing Plan excluded certain costs. "Specifically excluded from the study was any consideration of instructional program costs and other costs related to similar pupils services (counseling, psychological and medical services, etc.)."[2] Although some of these costs maybe the same under proposed schedules, these studies should be complete with regard to those costs that are potentially different under the plans being considered.

Regarding the issue of validity when measuring school costs, it is necessary to account for the costs in a way that isolates and identifies those costs associated only and specifically with a change in schedules. Costs that may be different from one plan to another, yet not associated with the change in plan, must be carefully factored from the design. For example, when considering teacher costs, one must be certain to use an average cost figure for the teachers involved, It would be erroneous to conclude, as was reported by the Illinois Citizens Year-Round Study

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[1] "The Economics of a Year-Round School Plan," (Seattle: Boeing Computer Services--Mimeo), 1974.

[2] "The Economics of a Year-Round School Plan," (Seattle: Boeing Computer Services--Mimeo), 1974, p. 1.

Committee[1], that schools under a particular schedule cost less simply because the teachers in those schools happen to be less experienced and have fewer educational credits than teachers in the comparison schools. Clearly when actual salaries are used in the analysis, a cost benefit maybe properly associated with the employment of less costly teachers rather than a particular schedule under investigation. The remedy for this problem is to use an average teacher cost for all teachers in both the year-round and traditional plans. Similar caution must be used when measuring costs in each cost category.

A related issue is one of determining a specific level of service to be provided under the plans being investigated. Regardless of how the service level is defined, that service must be the same under all plans being considered in the cost analysis. An example would be determining the student/teacher ratio under each of the plans. The same student/teacher ratio must be used regardless of the schedule. Another example would be determining the size of the school for which a principal or counselor is to provide service. It would be erroneous, for example, to assume that under a traditional plan a principal could provide service to a school with 600 students and then to assume that the same level of service would be provided under a 45/15 schedule when that same principal is providing service to 800 students. Levels of service must be the same so that changes in costs can be attributed only to a change in schedule and not to a different level of service that is provided. See Appendix B for a more complete discussion of level of service.

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[1]"Results of Year-Round School National Survey," (DuPage County, Illinois: Community Unit School District No, 203--Mimeo), 1975.

One final potential source of invalidity was illustrated by the firm Person-O-Metrics, Incorporated for their study of the Northville, Michigan School District.[1] This source of invalidity results from assuming a greater number of total students to be served in the school district under a year-round plan. Using this inflated number of students, and then calculating a cost per student associated with alternative scheduling plans, will always yield a reduced cost for the extended year program. Clearly, however, a given school district cannot create these additional students to be served within school district boundaries. The number of students within any school district is obviously a fixed number. Given that number of students, they maybe scheduled into a different number of school buildings--depending upon the plan being used by the district--but costs cannot be reduced simply by inflating the number of students served. All students must be served in some school; if they are added to one school, they must be removed from another school.

Summarizing the review of literature, it is evident that 1) cost categories must be completely identified for the scheduling plans under consideration, 2) cost must be measured with accuracy and validity, 3) costs must be considered for a particular level of service to students under alternative plans, and 4) costs for the alternative plans must be calculated using a fixed number of students within the school district.

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[1] "Extended School Year: Cost Benefits of a 45/15 Elementary Plan," (Dearborn Hgts, Michigan: Person-O-Metrics, Inc.), 1973.

SECTION III: STATEMENT OF PROCEDURES

To identify and analyze valid costs in the Bethel year-round program, two approaches were designed. The first approach, labeled Model I, used actual costs data reported on the district F-196 forms since 1972. The purpose for Model I was to investigate differences in the cost per pupil in all object categories before and after the year-round program was implemented in Bethel. The second approach, labeled Model II, used a simulation technique to address the question, "What would the costs be in Bethel if the traditional schedule were re-implemented?" The purpose of Model II was to calculate the costs that would be incurred if the 45/15 plan were ended and the traditional 180-day schedule were made operational. Each of the models is discussed in the following paragraphs.

Model I

As mentioned, the approach for Model I used cost data reported in the annual F-196 reports from the district for each year since 1972. Enrollments were used in each year to calculate a cost per pupil in each object category. It was anticipated that there would be observable differences in the costs per pupil before and after 1973-74 when the eary round program was implemented in Bethel. This approach has severe limitations which will be discussed in this section and in the section where results are reported.

To use this approach required the comparison of the object cost categories in Bethel to the costs in other school districts during the same time period. A collection of five school districts was identified for this purpose. It was anticipated that there would be an observable difference in costs in Bethel as a result of implementing the year-round program, and, that there would be no observable differences in costs for the districts in the central group.

The procedures for selecting the districts in the control group involved identifying characteristics of school districts that may impact school costs and then selecting those districts that most closely resembled Bethel. The district characteristics identified included (1) median family income, (2) average teacher salary, (3) total number of employees, (4) percent of budget spent on basic education, (5) enrollment, (6) assessed property valuation per pupil, and others. A total of 14 characteristics were investigated. Those districts which most closely resembled Bethel on these six characteristics (and also on six of the eight remaining characteristics) were selected as the control group. Five districts were identified and selected in this way. When data related to these districts are presented in this study, the districts will be identified with an alphabetic label. The five districts selected and their alphabetic labels are presented in Table Two. Selected data for these districts and for Bethel are presented in Table Three.

TABLE TWO

DISTRICTS SELECTED FOR CONTROL GROUP

District	Label
Battleground	A
Central Kitsap	B
Franklin Pierce	C
Mead	D
Oak Harbor	E

TABLE THREE

SELECTED DATA FOR DISTRICTS IN CONTROL GROUP

DISTRICT	ENROLLMENT	ASSESSED VALUATION PER PUPIL	MEDIAN INCOME	AVERAGE TEACHER'S SALARY
A	5,978	$36,255	$ 9,680	$12,271
B	6,221	39,660	10,890	13,395
C	7,200	25,765	9,830	14,353
D	5,286	38,325	11,030	13,670
E	5,610	25,689	8,540	13,498
BETHEL	6,781	29,069	9,010	13,385

As briefly described, the analysis of costs in Model I used the cost data in each object category as reported on Annual F-196 reports; also used were annual enrollment data so that a cost per pupil could be calculated in each object catefory. It was expected that a cost difference could be observed in Bethel as a result of implementing the 45/15 plan that could not be seen in the districts of the control group. There are serious limitations to this approach.

The primary limitation to this approach is that cost differences that may be observed could be the result of competitive factors and not the result to the particular schedule of student attendance. There are many significant and likely reasons for costs to be different and, at the same time, to be independent of the student schedule of attendance. One reason for cost differences is the difference in the amount of money available. Although this

factor has been somewhat controlled (by including assessed valuation per pupil as a selection criterion for control districts) there has been no control of dollars that would be available from special levy elections. If districts are traditionally successful at levy passage, more dollars would be available to spend than if levies traditionally fail. If levies pass, then, more dollars would be spent and cost would appear to be higher--regardless of the schedule of student attendance.

Another equally important limitation of Model I is that the 45/15 schedule has been only partially implemented in Bethel. High school students in Bethel attend school on the traditional 180-day schedule. Dirtrict-wide data, as are reported on F-196 forms, are therefore not completely reflective of costs related to the 45/15 schedule. There is some contamination of data when considering costs attributable to the year-round schedule.

Although it would be possible to control, to a degree, the effect of these limiting factors, there are many others that would also require some control. Among these are (1) the different costs that are paid by districts for services reported in the different object categories; (2) the different number of contract days for services received from teachers, administrators, secretaries, custodians, and others; (3) the different methods of acquiring service (e.g., transportation) that would be reported in different object categories depending on the method of acquiring the service; and many others. Again, it may be possible to control, to some degree, the effects of these differences, but that control would be beyond the scope of this reaserch.

To summarize the approach designated as Model I, a cost per pupil was calculated in each object category. Costs in these categories in Bethel were compared to similar costs in five control districts. The Model has limitations which are difficult to control.

Model II

The procedures for the second approach to study year-round costs involved a simulation technique. As was suggested in the Review of Literature, this approach (1) identified specific costs to be considered, (2) identified the levels of service to be provided and (3) calculate a cost of providing the service under a 45/15 schedule and under a traditional schedule. This simulation technique provides a framework for considering costs so that an estimate of the cost to return to the traditional schedule in Bethel can be calculated.

Costs to be Considered

During the course of conducting this research, it was agreed with district personnel in Bethel that the following costs would be considered under the simulation:

1. Building administration costs
2. Teacher costs
3. Secretarial, clerk, and aide costs
4. Costs for instructional specialists
5. Food service costs
6. Transportation costs
7. Custodial costs
8. Maintenance
9. Library costs
10. Utility costs
11. Costs for central administration
12. Instructional support costs

To calculate values in each of these costs categories, it is necessary to define the levels of service to be provided in each of the categories. That is, the procedures for providing these services must be defined for both the 45/15 plan and for the traditional plan.

Levels of Service

One technique to conceptualize service levels is to identify the number of school buildings that would be needed to house all students in the district under the two schedules. Clearly, more space would be needed to house students under a traditional schedule than under a 45/15 schedule. But this additional space could be provided in several ways--at least theoretically. Three alternatives for providing the needed space will be discussed. Each alternative would require a different number of schools to house all the students in the district. Once this needed number of school buildings is determined, it is then possible to define the staffing patterns at each of the schools so that costs for the service to students can be calculated at each of the schools. Under the traditional schedule, the three alternative plans for providing the needed school space are:

1. Alternative A. The first alternative for providing the needed school space would require an expansion at each existing school plant. Through the addition of classroom wings and the expansion of auxiliary space, the existing capacity would need to be increased to house 1/3 more students during the nine-month school year.
2. Alternative B. The second alternative would require an expansion of space at the two existing junior high school plants and the construction of two new elementary school plants.
3. Alternative C. The third alternative would require construction of two new elementary schools and a new junior high school, which

may be somewhat smaller than the existing junior high schools.

In Bethel, each of these three alternatives would require a different staffing pattern and would generate different costs for the district. Each alternative is therefore discussed with regard to the 12 cost categories identified for the simulation. To calculate costs for each of the three alternatives in the 12 cost categories, average costs during 1977-78 have been used.

Building Administration Costs

Principal costs are a function of the average cost for a principal, the number of days in the principal's contract and the number of principals hired for the district schools. These costs would be different for each of the three alternatives identified above. Under Alternative A there would be no change in the number of principals hired in the district. However, the existing principals would serve fewer days in their contract. Specifically, the principals' contracts would be reduced for 240 days to 210 days. This reduction in the number of days would result in a reduced cost to the school district under Alternative A. Under Alternative B, there would be a similar reduction in the number of days in the principal's contract. Alternative B, however, would require the addition of two principals at the new elementary schools to be constructed. Therefore, district costs for school building administration would be increased under Alternative B. Under Alternative C, there would also be a reduction in the number of days in the principal's contract. Further, there would be the need to hire principals for the two elementary schools to be constructed as well as a need to hire a principal for the new junior high school. In addition to these administrators, a half-time vice-principal and counselor would be needed for the new junior

high school. The costs to provide these services are calculated below.[1]

Alternative A:

Reduce principals' contracts from 240 days to 210 days.

Elementary: 6 X (240-210) X $141.90 = $25,542

Junior High: 2 X (240-210) X $148.50 = $ 8,910

Net change: A reduction of $34,452

Alternative B:

Reduce principals' contracts as above.

Reduction of $34,452

Hire two principals (for 210 days) for the elementary schools.

Increase of 2 X 210 X $141.90 = $59,598

Net change: An increase of $22,146

Alternative C:

Reduce principal's contract as above.

Reduction of $34,452

Hire two new elementary principals

Increase of $59,598

Hire junior high principal

Increase of 210 X $148.50 = $31,185

Hire junior high vice-principal--half-time

Increase of 200 X .5 X $122.10 = $12,210

Hire junior high counselor

Increase of 183 X $97.98 = $17,930

Net change: An increase of $86,471

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[1]Include a 10% factor for fringe benefits for certified employees and a 25% factor for classified employees.

Teacher Costs

Assuming an equal student/teacher ratio, there would be no difference in teacher costs between the existing year-round schedule in Bethel and any of the three alternatives set forth in this research. Because there is a fixed number of students to be served in the district, and because there would be a fixed student/teacher ratio in the district, there would be no difference in the number of teachers hired in the district--regardless of the alternative used to provide needed space. There maybe some additional costs associated with the year-round schedule because there must be some means provided to store teacher materials during the 15-day period when teachers are not using them. This instructional storing space could be provided by closets, carts, or some similar procedure. These costs will be made more explicit when considering instructional support costs.

Summarizing teacher costs, there would be no difference in providing teachers for students in Bethel regardless of the schedule employed.

Secretarial, Clerk and Aide Costs

Secretarial and clerical assistance is essentially allocated on a school basis. Costs for these services would therefore be dependent upon the number of schools used to house district students. That is, costs would depend on which alternative is used to provide needed school space. Under Alternative A, there would be a reduction in the number of contract days served by secretaries and clerical assistants. This reduction would be from 240 days to 200 days. A reduction in these costs would therefore be expected under Alternative A. Under Alternative B, there would be a need to provide a secretary and clerical team at each of the new elementary schools to be constructed. Although there would still be a reduction in the number of days served by the secretary and clerical teams, an overall

increase in these costs would be anticipated under Alternative B. Under Alternative C, there would be again a reduction in the number of days served by the secretarial and clerical teams. However, under this alternative, there would be a need for an additional secretarial team at the two elementary schools in addition to a new secretary--without the clerical assistant--at the new junior high school. A precise calculation of the costs under the three alternatives is provided below.

Costs for instructional aides would be related to the number of students served. Similar to teachers, there would be a ratio between the number of instructional aides provided and the number of students served. There would be no difference in costs for instructional aides under any of the alternatives, regardless of the schedule of student attendance.

Alternative A:

Reduce the number of days of service provided by the secretary and clerical assistant from 240 days to 200 days at each of the eight schools.

Secretary: 8 X (240-200) X $55.30 = $17,696

Clerk[1]: 8 X (240-200) X $29.31 = $ 9,380

Net change: A reduction of $27,076

Alternative B:

Reduce the number of days service.

Reduction of $27,076

Hire secretary and clerical assistant for two new elementary schools.

Increase for secretary: 2 X 200 X $55.30 = $22,120

Increase for clerk: 2 X 200 X $29.31 = $11,724

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[1]The clerk's wages are calculated assuming a five-hour work day.

Net change: An increase of $6,768

Alternative C:

Similar to Alternative B, reduce the number of days service and hire a secretary and clerical assistant for two new elementary schools.

Increase: $6,768

Hire secretary only for new junior high school

Increase: 1 X 200 X $55.30 = $11,060

Net change: An increase of $17,828

Costs for Instructional Specialists

In Bethel, instructional specialists are employed 240 days per year under the year-round program. It is reasonable to assume that these costs are accurately measured on a per pupil basis. Therefore, under the traditional schedule, an equivalent number of dollars would be spent for these services regardless of the configuration of school space. There would therefore be no difference in costs for these specialists when considering either the year-round schedule or the traditional schedule.

Food Service Costs

Food service costs may be considered in two cost categories; i.e., capital outlay and operations. If the existing food service facilities at the schools are inadequate to serve all students on a traditional schedule, then additional facilities would have to be provided--either through expansion of present facilities at the existing schools or through the addition of facilities. The expansion or additions of these facilities would be a capital outlay. Regardless of the capital outlay expenditures, operations costs are related to the configuration of the food service delivery procedures.

In Bethel, this operation has been required to "break even," that is, costs must be balanced by income generated through service to students. The requirement to "break even" would exist regardless of the configuration of school space in the district. There would be no difference in costs among the alternatives or between the schedules under consideration.

Transportation Costs

Transportation costs are a function of the number of miles driven more than they are a function of the number of students served. Therefore, because there is no geographical grouping of students under the 45/15 schedule, buses must travel over considerably the same routes for 240 days rather than for 180 days. This would create additional transportation costs for the 45/15 schedule. Conversely, costs for transportation would be reduced under a traditional schedule. The amount of the decrease may be somewhat difficult to determine without a detailed analysis of the routes that must be driven during each portion of the year. The maximal reduction would be 25 percent. However, because not all routes need to be traveled each of the 240 days (under the 45/15 plan) the reduction in costs would be less than this maximal amount. According to a study completed by ESD 113, a reasonable estimate of the decrease in costs would be 18%.

The amount of reduction that could be reasonable expected in Bethel would depend upon the location of new schools built. It will be assumed, however, that a roughly equivalent savings could be achieved regardless of the alternative selected to provide educational space.

In addition to difference in operating costs, there would also be a need for capital expenditures. In returning to the traditional schedule, additional buses would need to be purchased. Depending upon routing and scheduling decisions, the number of buses needed would be between 12 and 15.

Custodial Costs

In Bethel, custodial personnel are hired under a 12 month contract. Custodial personnel costs are therefore directly related to need for service. This need is a function of the number of square feet to be cared for. When returning to the additional schedule, a roughly equal number of square feet would need to be constructed. Therefore, under each of the three alternatives for providing needed space, the custodial costs would be equivalent. Although these costs would be equivalent, it is most convenient to calculate specific costs using Alternative C. It is anticipated that under Alternative C, two additional custodial workers would be hired as well as one additional head custodian. Specific costs for the services are calculated below, assuming one custodian for 30,000 square feet.

In addition to the custodial teams at each of the schools, the Bethel school district hires two custodial employees to serve as a "scrub team" for all of the schools in the district. It is assumed that this practice would continue upon returning to a traditional schedule. However, because the amount of educational space would be increased on returning to the traditional schedule, this team would require additional personnel. The cost for a part-time assistant (¼ time) is included in the calculations below:

Alternatives A, B, and C:

Hire three head custodians

Increase of 3 X 260 X $55.60 = $43,368

Hire Custodial workers

Increase of 2 X 260 X $50.30 = $26,156

Hire scrub team worker

Increase of 260 X .25 X $50.30 - $3,260

Net change: An increase of $72,784

Maintenance Costs

To evaluate maintenance costs, two causes of costs must be considered. First, there is cost generated by student use. Second, there is cost generated by the presence of a school building. Examples of the first cost would be maintenance required for door closets, drinking fountains, light switches, etc. Examples of the second cost would be maintenance for exterior trim on the school building, the school roof, the school plumbing, etc.

Costs related to student use would be equivalent under the traditional and year-round programs, because the total number of students served would be the same. Costs associated with the presence of a school building are a function of the number of school buildings as well as the materials and building subsystems designed into the structures. Without question, there would be some increase in these costs as Bethel moved from the year-round schedule to the traditional schedule. However, the magnitude of these costs cannot be determined without knowing the materials and building subsystems that maybe used to provide the needed space. Therefore, these costs would be indeterminate in this research.

To summarize, maintenance costs related to student use will be equivalent under the traditional and year-round schedules. Maintenance costs related to the presence of a school building will increase under the traditional schedule, but the specific increases are indeterminate. An exception to this analysis would be for those items that typically receive routine maintenance during the three summer months of the traditional schedule. Because there is no "three month break" under the 45/15 schedule, maintenance activities that would be scheduled for the summer months must be completed by scheduling those activities within the 45/15 plan. This constraint has caused a slight increase in maintenance costs because some of the work must be completed

during overtime shift. These costs have totalled approximately $3,000 per year under the 45/15 schedule. These costs would be reduced or eliminated by a return to the traditional schedule.

Library Costs

Library costs must be considered in two categories. First there are costs for materials, books, periodicals, and the related equipment. Second, there are costs for personnel. The costs for new books and materials would be related to the means by which additional space was provided for students. If complete new schools are built, clearly the schools will need complete libraries. To provide these libraries would require initial "set up" costs. There would be one time costs to provide the books and related materials for libraries. These costs maybe estimated by assuming an average cost per book and estimating the number of books per student needed in each of the libraries; costs for equipment and related materials could be estimated by assuming a cost per student. Once the libraries are established, the annual replacement costs should be equivalent regardless of the schedule of attendance. That is, the replacement schedule is a function of the number of students served, rather then the schedule of attendance.

Personnel costs for libraries will be a function of the number of school buildings needed to provide school space. When returning to the traditional schedule under Alternative A, the number of days of librarian service would be reduced to 190 days. This reduction in service would reduce costs under Alternative A. Under Alternative B, the same reduction in days serviced would result. However, under Alternative B, two new librarian clerks would need to be hired at the new elementary schools. Under Alternative C, there would be a similar reduction in days serviced, a similar need to hire the two clerks in the elementary schools, but an additional

certificated librarian would need to be hired for the new junior high school. The costs of these alternative personnel configurations are estimated below.

Alternative A:

Reduce the number of days service from 240 to 190

Junior high: 2 X (240-190) X $97.98 = $9,798

Elementary[1]: 6 X (240-190) X $31.35 = $9,405

Net change: A reduction of $19,203

Alternative B:

Reduce the days of service as above

Reduction of $19,203

Hire clerks at the two new elementary schools

Increase of 2 X 190 X $31.35 = $11,913

Net change: A reduction of $7,290

Alternative C:

Reduce the days of service as above

Reduction of $19,203

Hire clerks at the two new elementary schools

Increase of $11,913

Hire a new certified librarian at the new junior high

Increase of 190 X $97.98 = $18,616

Net change: In increase of $11,326

Utility Costs

There is a potential difference in costs between the year-round and traditional schedules for utilities. Because the 45/15 schedule uses school

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[1]The elementary library clerk works six hours per day.

buildings when heating requirements are minimal, this schedule could reduce heating costs over the calendar year. The traditional schedule uses the school buildings when heating costs are higher. The saving for the 45/15 schedule can be achieved because there is no air-conditioning requirements in the Bethel schools. However, because no air-conditioning is provided, it is possible that the "same level of service" is not being provided. The "same level of service" can only be provided when classrooms are provided with HVAC so that instruction takes place when the room temperature is within an acceptable comfort range. If this comfort range cannot be achieved without the use of air-conditioning, then the AC costs must be included so that "equal service" is provided regardless of the schedule.

There are other costs which must be considered for utilities. Among these costs are natural gas consumption, propane consumption, furnace oil consumption, water consumption, sewage disposal, garbage disposal, and possibly others. The calculation of utility costs for a particular building is complex; that is, it is difficult to identify all potential variables which may influence utility costs. Among these variables that must be considered are 1) the "R" values for the walls and ceiling, 2) mechanical equipment used to provide heat, 3) the temperature levels maintained in the classrooms, and many others. Utility costs <u>for the district</u> are therefore measured in a more valid way at the district level rather than measuring them at the building level. That is, there are many variables to be considered in these costs other than the schedule of student attendance at a particular building. Therefore, no differences will be identified among the Alternatives A, B, and C under consideration in this research.

Central Office Administrative Costs

Without question, the 45/15 is a more complex system to administer. Additional time must be spent in scheduling, routing, supervising, and managing. If additional administrators are not added, then the existing administrators must spend more time to complete all needed tasks. If equal service is provided, it could only be provided with additional administrative personnel under the 45/15 schedule. However, if the district were to return to a traditional schedule, additional central office personnel maybe needed. The increase in cost would depend upon the number of school buildings required for the return to the traditional schedule. Under Alternative A, no new school buildings would be constructed; the span of control for existing central office administrators would not be changed. However, under Alternatives B or C, there would be additional schools which would require the support and attention from central office administrators. An example of the service required from the central office would be the evaluation of the principal at each of the newly constructed buildings. Therefore, under either Alternative B or C, one additional professional administrator would be added to the central office staff. This administrator would require at least a half-time secretary. Costs for these additions are estimated below.

Alternative A:

No change in central office staff

Alternative B and C:

Add one full-time administrator

Increase of $33,000

Add one half-time secretary for twelve months

Increase of 260 X $55.30 = $14,378

Net change: An increase of $47,378

Instructional Support Service

Costs for instructional materials are related to the number of students served. There should be no difference in these costs for the two schedules. As mentioned, however, there is a need to provide storage space for teachers who are not teaching. In new buildings this could be provided as permanent storage. In existing buildings it must be provided at some extra cost. The school district has provided this storage space at existing schools by purchasing movable cabinets. This one-time cost has been less than $3,500.

Summary of Model II

To analyze costs using Model II, a simulation technique has been developed. The simulation technique requires 1) an identification of specific cost areas to be considered, 2) an identification of the level of service being provided, 3) the identification of alternative plans for providing needed school space, and 4) identifying specific costs in the cost areas under investigation. Using the costs identified, an estimate can be determined for operating schools on the traditional and year-round schedule.

A summary of the results using both Models I and II is provided in the following section.

SECTION IV: RESULTS

As described in the previous section, two models were used to investigate costs in Bethel. Model I involved a calculation of per pupil costs in each object category[1] as reported in annual F-196 reports. Model II involved a simulation of costs under alternative service levels. The results from Model I and Model II are presented in the following sections.

Model I

The data from F-196 reports have been collected for Bethel and for the five districts in the control group. These data are presented on the following pages in three different formats. In Table Four, data are presented by district--for Bethel and for the five control districts. The annual costs since 1972 are reported for the nine object categories. A total cost per pupil is also provided for each year. In Table Five, data are reorganized and presented for each of the object categories to facilitate a comparison between Bethel and the control districts. Finally, in Figure One, the data are presented graphically for each object category.

The data follow. As was discussed, there are limitations regarding the conclusions that can be legitimately drawn from the approach used in Model I. Additional discussion of the limitations appear following the presentation of data.

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[1] In the State of Washington, accounting procedures identify nine object catetories. These categories are 1) Certificated Salaries (which were included in object category 2 beginning in 1974-75), 2) Professional and Technical/Certificated Salaries, 3) Secretary, Craft and Others/Classified Salaries, 4) Employee Benefits, 5) Supplies and Materials, 6) Books/Instructional Materials, 7) Contractual Services, 8) Travel, and 9) Capital Outlay.

TABLE FOUR

PER PUPIL COSTS ORGANIZED BY DISTRICT AND BY OBJECT CATEGORY

BETHEL

	1	2	3	4	5	6	7	8	9
1977		718.22	211.31	121.27	92.09	21.83	66.97	3.42	35.73
1976		686.04	194.04	66.99	84.77	21.74	61.87	2.63	25.45
1975		631.07	174.55	75.81	86.49	23.99	58.59	2.59	45.15
1974	508.95	20.00	125.18	59.10	68.42	13.95	42.38	1.64	34.87
1973	471.07	18.14	117.42	46.93	59.99	11.82	42.82	1.46	17.56
1972	409.92	15.48	101.10	37.08	59.52	9.23	42.70	1.21	24.56

TOTAL--ALL OBJECT CATEGORIES

1977: $1,270.84

1976: 1,143.53

1975: 1,098.24

1974: 874.49

1973: 787.21

1972: 700.80

TABLE FOUR--Continued

BATTLE GROUND

	1	2	3	4	5	6	7	8	9
1977		632.71	137.57	86.41	80.62	10.81	219.76	2.65	6.80
1976		574.77	124.42	68.02	89.32	8.52	178.26	1.82	6.75
1975		518.73	158.97	64.91	93.81	11.47	68.02	1.77	25.53
1974	475.68	8.87	133.55	51.45	77.04	11.03	65.84	2.04	36.89
1973	404.93	8.20	100.82	40.71	70.69	17.54	50.90	1.34	17.80
1972	396.55	8.00	86.10	33.79	57.79	13.83	46.15	.86	13.35

TOTAL--ALL OBJECT CATEGORIES

1977: $1,177.33

1976: 1,051.88

1975: 943.21

1974: 862.39

1973: 712.93

1972: 656.42

TABLE FOUR--Continued

CENTRAL KITSAP

	1	2	3	4	5	6	7	8	9
1977		604.00	195.99	88.91	79.52	26.01	72.75	1.26	28.95
1976		586.98	222.87	81.86	82.22	27.79	147.52	2.65	38.78
1975		544.45	173.99	69.24	64.25	13.28	62.10	1.64	17.40
1974	516.67	6.91	144.03	62.54	67.42	11.50	49.82	1.70	23.71
1973	465.01	5.32	130.47	47.35	56.69	6.98	46.88	1.23	13.71
1972	477.27	5.17	142.24	44.98	62.70	13.29	56.96	2.06	32.99

TOTAL--ALL OBJECT CATEGORIES

1977: $1,097.39

1976: 1,190.67

1975: 946.35

1974: 884.30

1973: 773.64

1972: 837.66

TABLE FOUR--Continued

FRANKLIN PIERCE

	1	2	3	4	5	6	7	8	9
1977		934.21	252.21	107.66	201.35	50.61	100.39	.37	21.87
1976		787.81	246.83	105.93	74.93	55.84	36.13	3.19	42.24
1975		692.33	221.63	85.48	93.74	22.60	95.02	3.01	27.54
1974	655.28	18.23	178.85	86.05	94.33	12.36	84.31	4.40	35.14
1973	613.36	10.47	159.71	59.65	71.94	12.90	72.77	3.76	30.91
1972	545.69	7.70	136.98	53.18	66.53	12.08	79.49	3.88	32.09

TOTAL--ALL OBJECT CATEGORIES

1977: $1,668.67

1976: 1,352.90

1975: 1,241.35

1974: 1,168.95

1973: 1,035.47

1972: 937.62

TABLE FOUR--Continued

MEAD

	1	2	3	4	5	6	7	8	9
1977		661.09	178.22	124.12	100.39	13.95	93.85	4.19	72.22
1976		600.76	124.05	71.98	72.07	26.17	167.77	2.50	12.19
1975		555.42	140.76	63.72	83.30	18.82	66.88	1.99	25.82
1974	541.04	3.60	120.72	43.99	62.47	16.51	80.59	1.20	31.92
1973	474.53	5.14	111.97	35.88	61.85	6.79	85.82	.96	2.07
1972	271.72	5.80	73.65	24.67	33.22	1.76	47.26	.71	.81

TOTAL--ALL OBJECT CATEGORIES

1977: $1,248.03

1976: 1,077.49

1975: 956.71

1974: 902.04

1973: 785.01

1972: 459.60

TABLE FOUR--Continued

OAK HARBOR

	1	2	3	4	5	6	7	8	9
1977		716.17	146.43	80.19	49.66	49.66	16.29	3.01	28.87
1976		661.43	159.01	75.60	102.24	15.54	65.47	3.20	11.99
1975		598.38	23.61	79.14	20.38	11.65	10.19	.83	1.65
1974	568.83	7.19	122.17	62.33	65.84	11.26	46.39	2.23	20.60
1973	529.45	2.50	111.73	53.78	54.91	11.78	44.15	1.67	19.04
1972	501.23	3.87	99.98	40.09	50.37	11.83	38.83	1.64	16.10

TOTAL--ALL OBJECT CATEGORIES

1977: $1,090.28

1976: 1,094.48

1975: 745.83

1974: 906.84

1973: 829.01

1972: 763.94

TABLE FIVE

PER PUPIL COSTS ORGANIZED BY OBJECT CATEGORY AND BY DISTRICT

OBJECT CATEGORY 1: CERTIFICATED SALARIES			
DISTRICT	1971-72	1972-73	1973-74
Bethel	409.92	471.07	508.95
A	396.55	404.93	475.68
B	477.27	465.01	516.67
C	545.69	613.36	655.28
D	271.72	474.53	541.04
E	501.23	529.45	568.83

OBJECT CATEGORY 2: PROFESSIONAL AND TECHNICAL/ CERTIFICATED SALARIES						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	15.48	18.14	20.00	631.07	686.04	718.22
A	8.00	8.20	8.87	518.73	574.77	632.71
B	5.17	5.32	6.91	544.45	586.98	604.00
C	7.70	10.47	18.23	692.33	787.81	934.21
D	5.80	5.14	3.60	555.42	600.76	661.09
E	3.87	2.50	7.19	598.38	661.43	716.17

TABLE FIVE--Continued

OBJECT CATEGORY 3: SECRETARY, CRAFT AND OTHERS/ CLASSIFIED SALARIES						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	101.10	117.42	125.18	174.55	194.04	211.31
A	86.10	100.82	133.55	158.97	124.42	137.57
B	142.24	130.47	144.03	173.99	222.87	195.99
C	136.98	159.71	178.85	221.63	246.83	252.21
D	73.65	111.97	120.72	140.76	124.05	178.22
E	99.98	111.73	122.17	*23.61	159.01	146.43

OBJECT CATEGORY 4: EMPLOYEE BENEFITS						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	37.08	46.93	59.10	75.81	66.99	121.27
A	33.49	40.70	51.45	64.91	68.02	86.41
B	44.98	47.35	62.54	69.24	81.86	88.91
C	53.18	59.65	86.05	85.48	105.93	107.66
D	24.67	35.88	43.99	63.72	71.98	124.12
E	40.09	53.78	62.33	49.14	75.60	80.19

TABLE FIVE-- Continued

OBJECT CATEGORY 5: SUPPLIES & MATERIALS						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1975-77
Bethel	59.52	59.99	68.42	86.49	84.77	92.09
A	57.79	70.69	77.04	93.81	89.32	80.62
B	62.70	56.69	67.42	64.25	82.22	79.52
C	66.53	71.94	94.33	93.74	74.93	201.53
D	33.22	61.85	62.47	82.30	72.07	100.39
E	50.37	54.91	65.84	20.38	102.24	49.66

OBJECT CATEGORY 6: BOOKS/INSTRUCTIONAL MATERIALS						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	9.23	11.82	13.95	23.99	21.47	21.83
A	13.83	17.54	11.03	11.47	8.52	10.81
B	13.29	6.98	11.50	13.28	27.79	26.01
C	12.08	12.90	12.36	22.60	55.84	50.61
D	1.76	6.79	16.51	18.82	26.17	13.95
E	11.83	11.78	11.26	11.65	15.54	49.66

TABLE FIVE--Continued

OBJECT CATEGORY 7: CONTRACTUAL SERVICES						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	42.70	42.82	42.38	58.59	61.87	66.97
A	46.15	50.90	65.84	68.02	178.26	219.76
B	56.96	46.88	49.82	62.10	147.52	72.75
C	79.49	72.77	84.31	95.02	36.13	100.39
D	47.26	85.82	80.59	66.88	167.77	93.85
E	38.83	44.15	46.39	10.19	65.47	16.29

OBJECT CATEGORY 8: TRAVEL						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	1.21	1.46	1.64	2.59	2.63	3.42
A	.86	1.34	2.04	1.77	1.82	2.65
B	2.06	1.23	1.70	1.64	2.64	1.26
C	3.88	3.76	4.40	3.01	3.19	.37
D	.71	.96	1.20	1.99	2.50	4.19
E	1.64	1.67	2.23	.83	3.20	3.01

TABLE FIVE--Continued

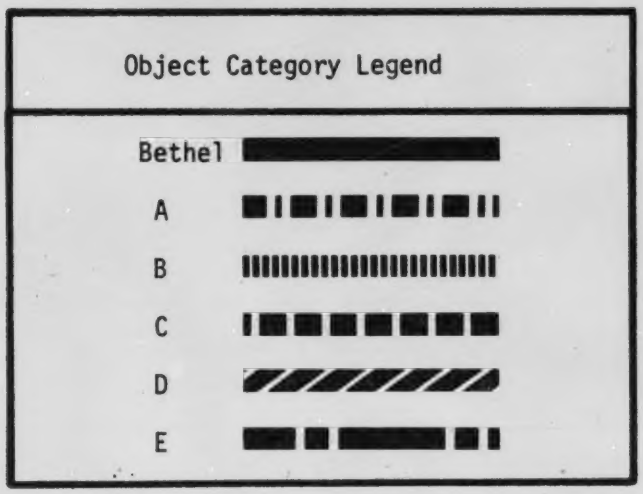
OBJECT CATEGORY 9: CAPITAL OUTLAY						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	24.56	17.56	34.87	45.15	25.45	35.73
A	13.35	17.80	36.89	25.53	6.75	6.80
B	32.99	13.71	23.71	17.40	38.78	28.95
C	32.09	30.91	35.14	27.54	42.24	21.87
D	.81	2.07	31.92	25.82	12.19	72.22
E	16.10	19.04	20.60	1.65	11.99	28.87

TOTAL--ALL OBJECT CATEGORIES						
DISTRICT	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Bethel	700.80	787.21	874.49	1,098.24	1,143.53	1,270.84
A	656.42	712.93	862.39	943.21	1,051.88	1,177.33
B	837.66	773.64	884.30	946.35	1,190.67	1,097.39
C	937.62	1,035.47	1,168.95	1,241.35	1,352.90	1,668.67
D	459.60	785.01	902.04	956.71	1,077.49	1,248.03
E	763.94	829.01	906.84	745.83	1.094 .48	1,090.28

FIGURE ONE

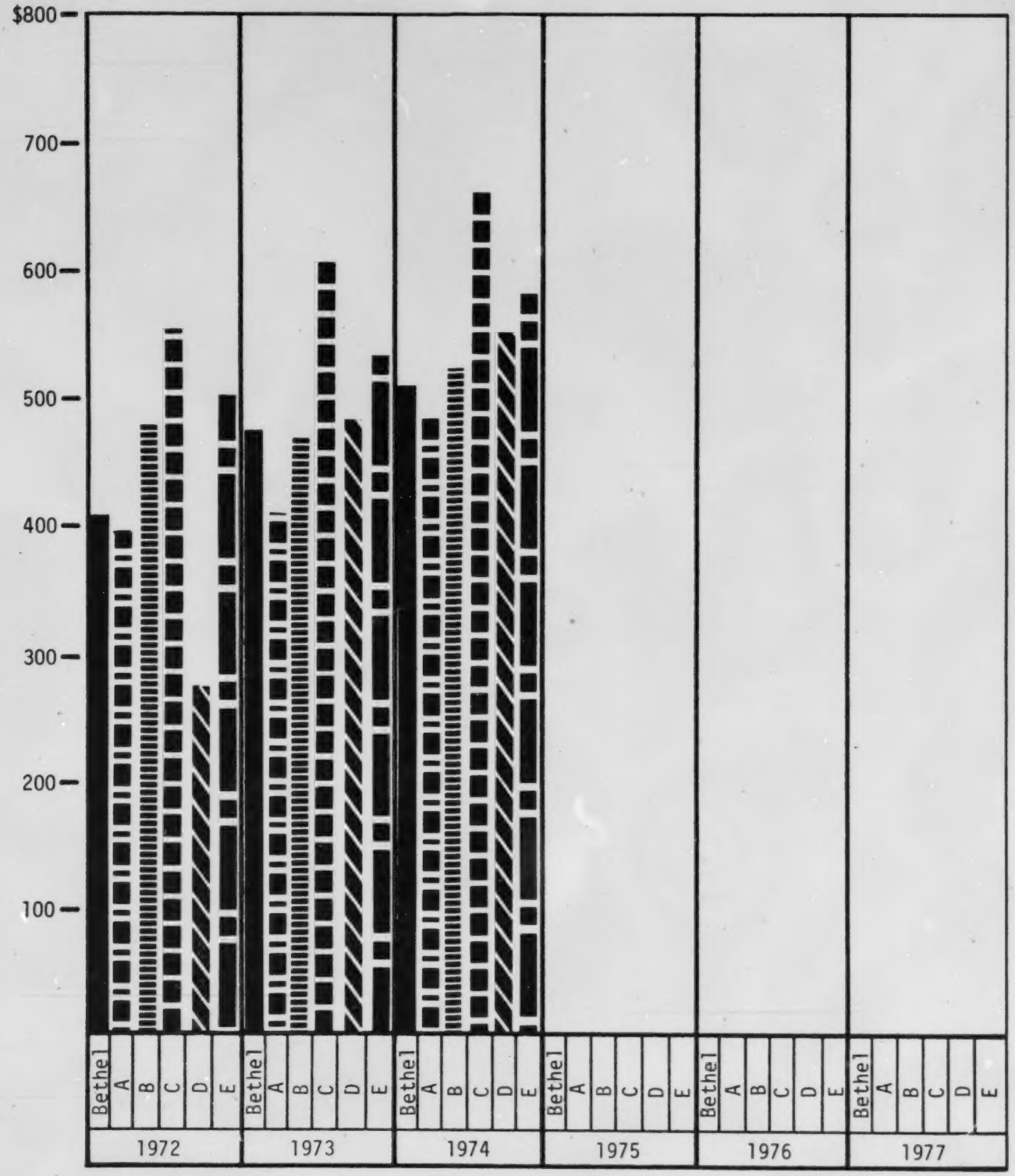
PER PUPIL COSTS BY OBJECT CATEGORY AND

BY DISTRICT



CERTIFICATED SALARIES

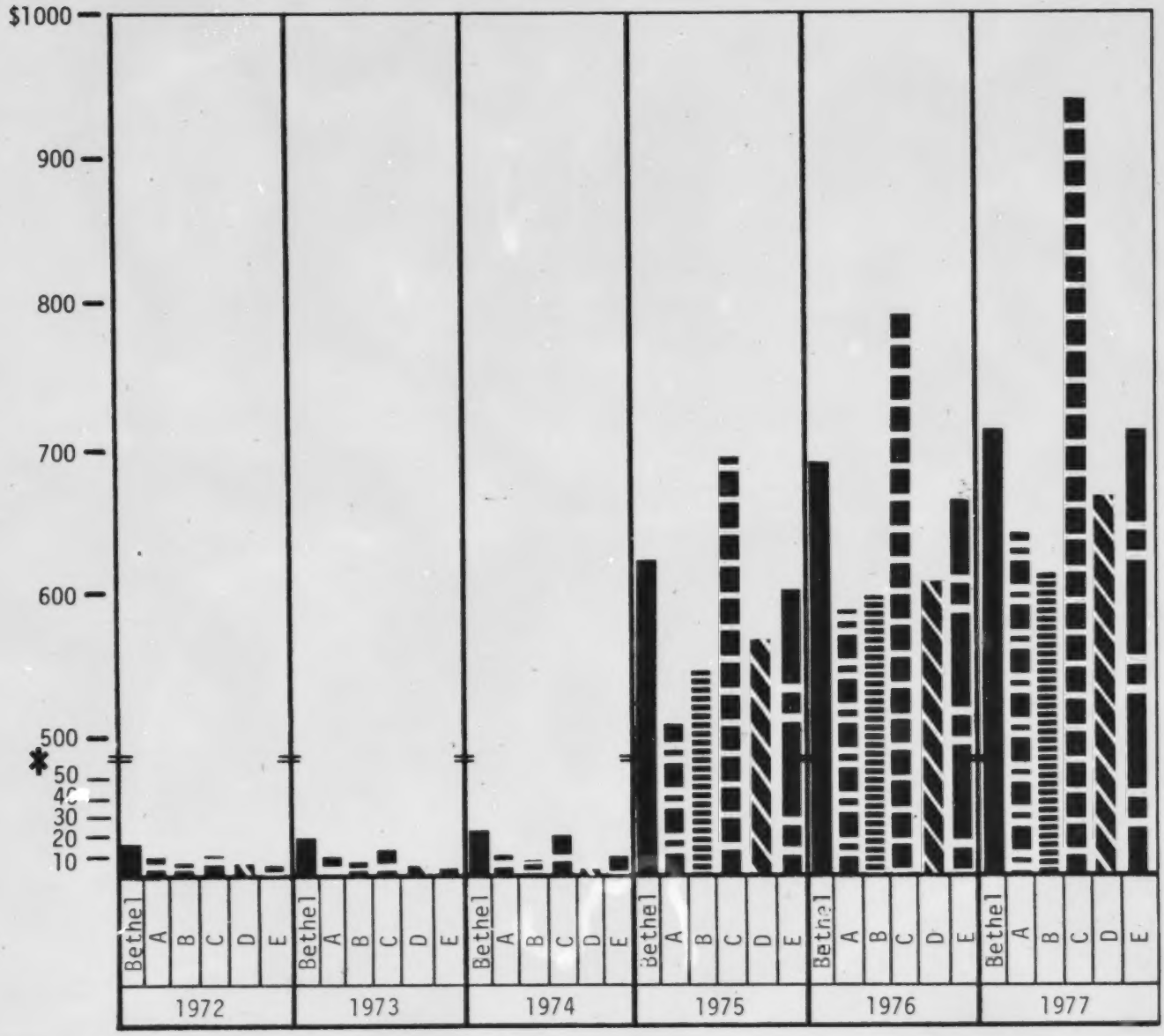
Per Pupil Cost - Object Catgory #1



PROFESSIONAL AND TECHNICAL/CERTIFICATED SALARIES

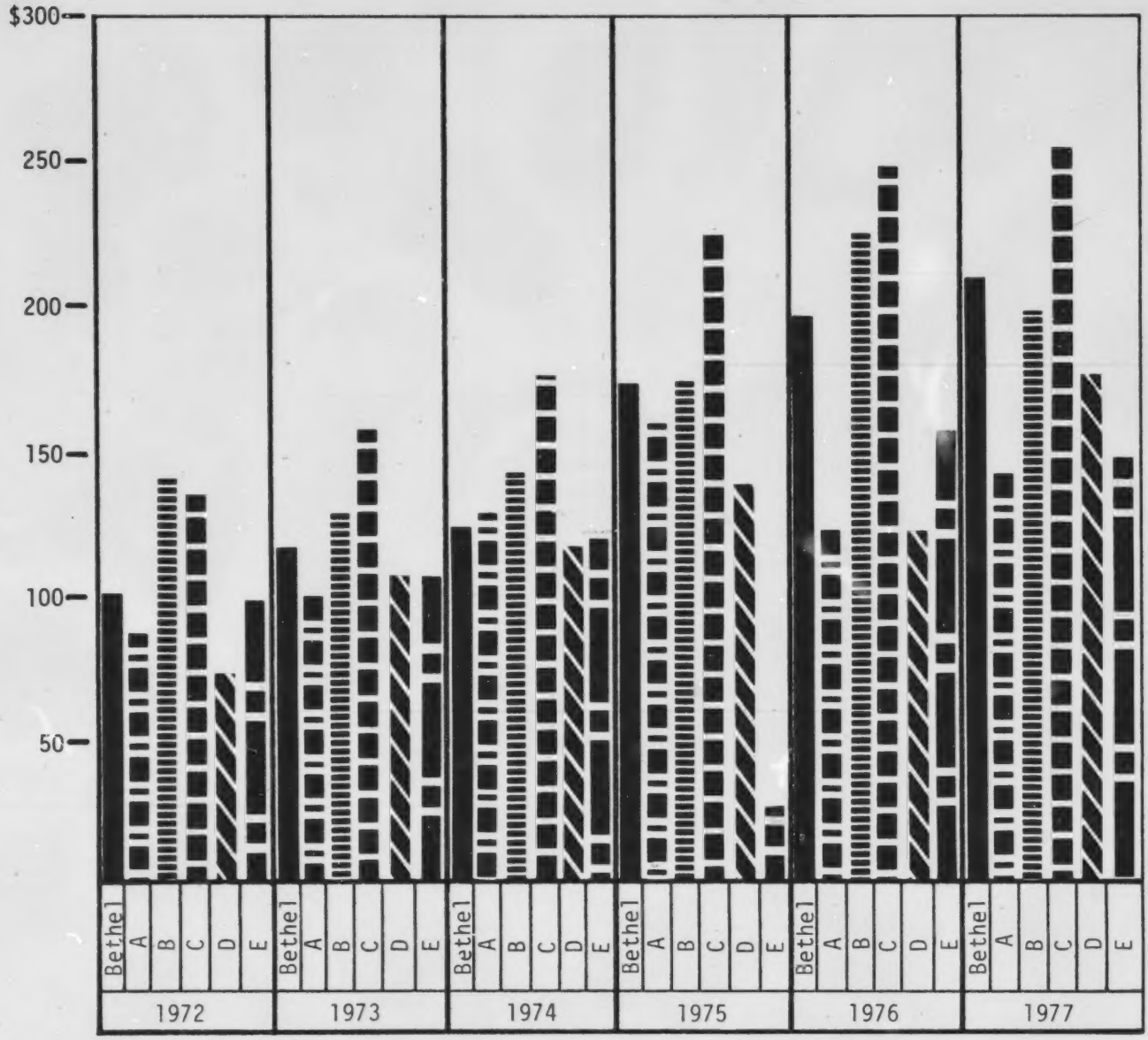
Per Pupil Cost - Object Category #2

✱The Accounting Proceedure Was Changed In 1975



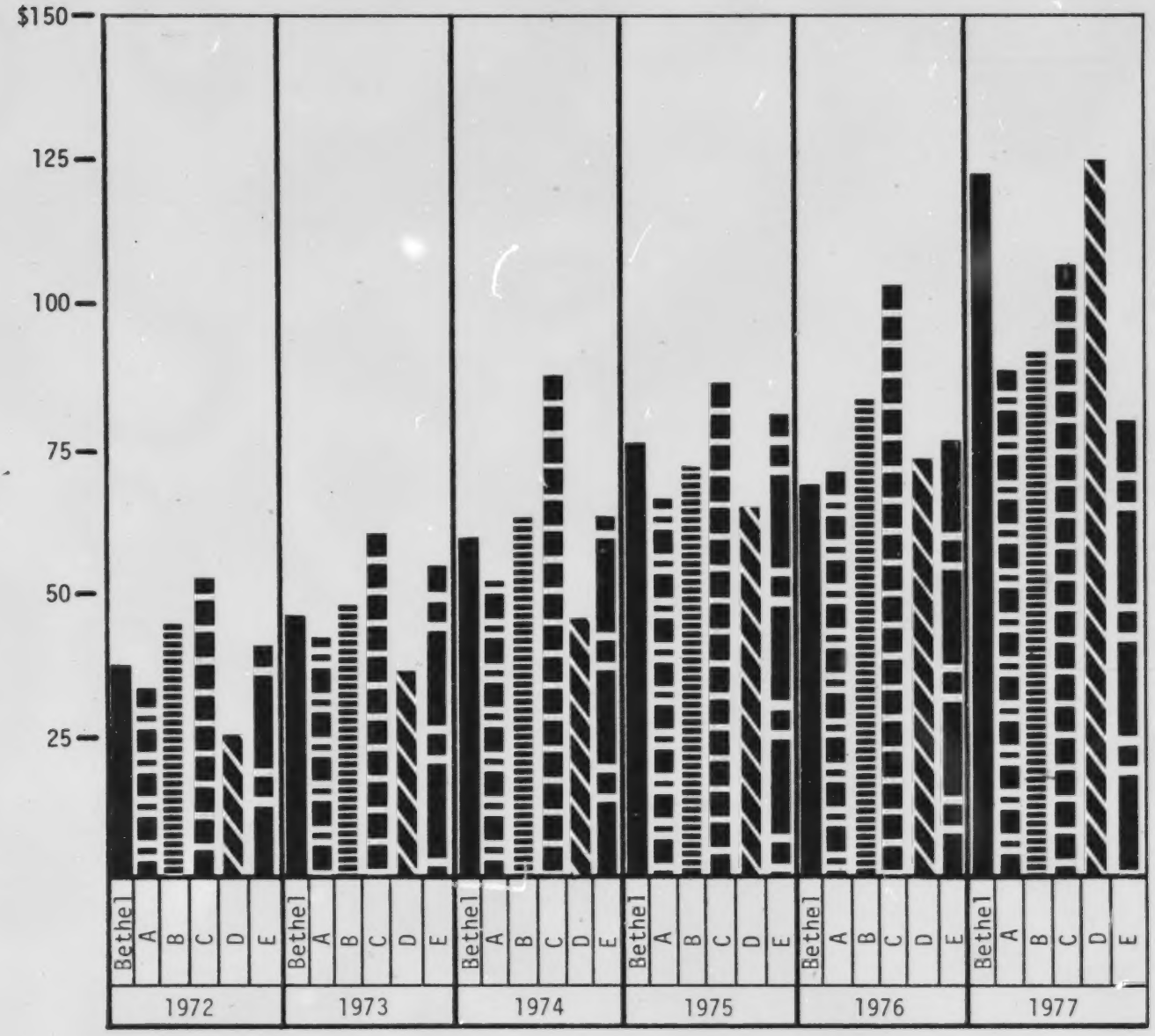
CLASSIFIED SALARIES

Per Pupil Cost - Object Category #3



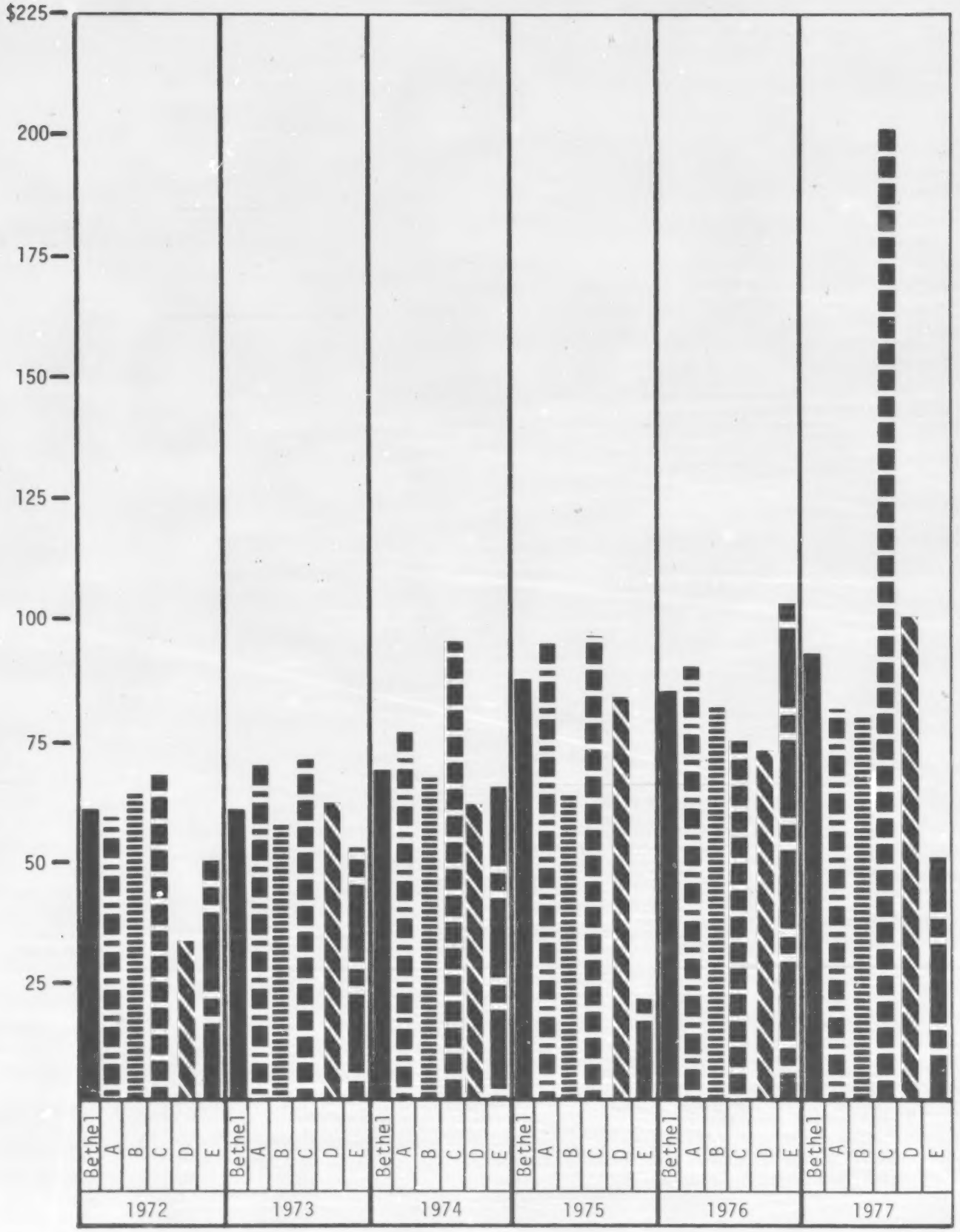
EMPLOYEE BENEFITS

Per Pupil Cost - Object Category #4



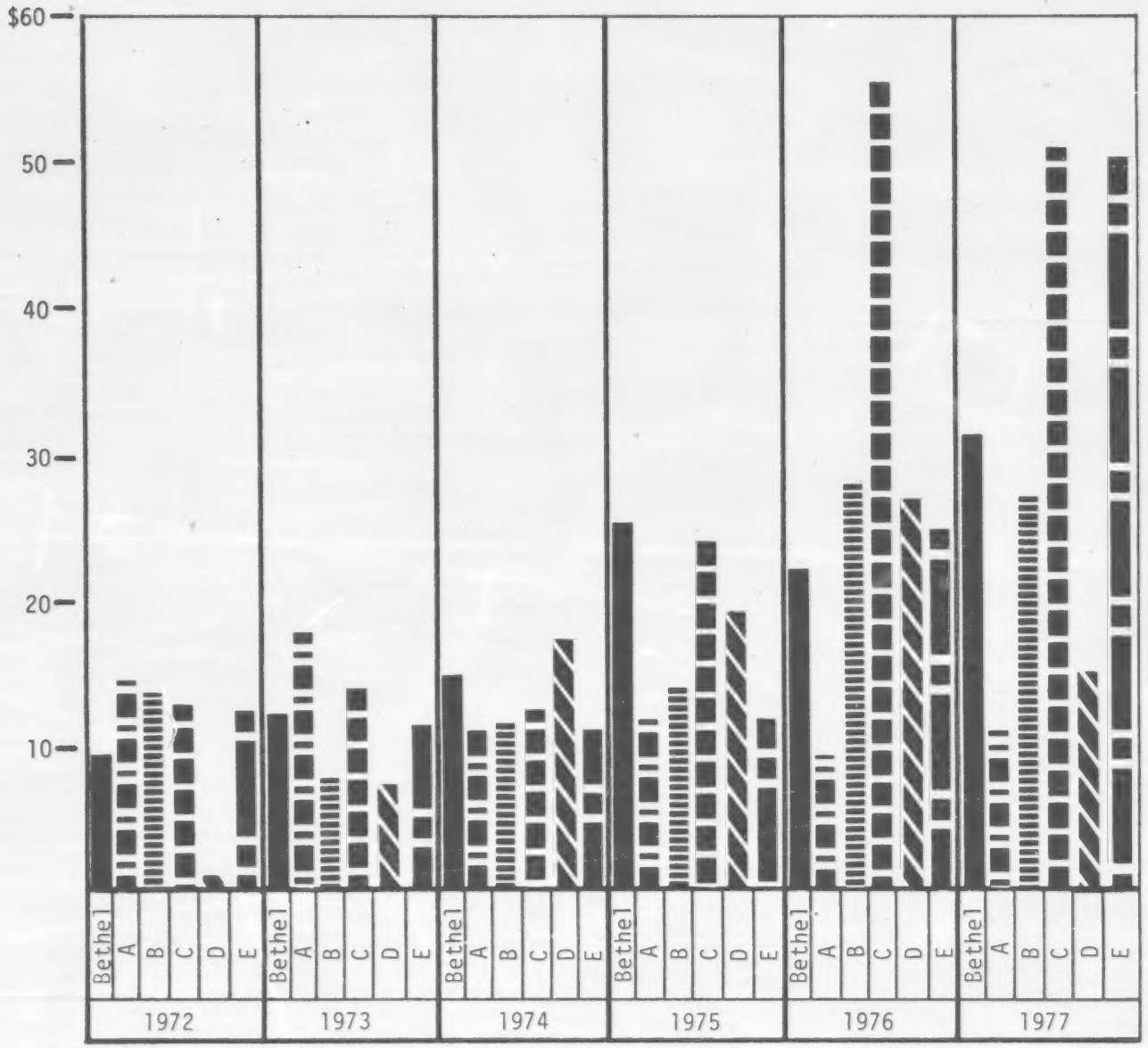
SUPPLIES

Per Pupil Cost - Object Category #5



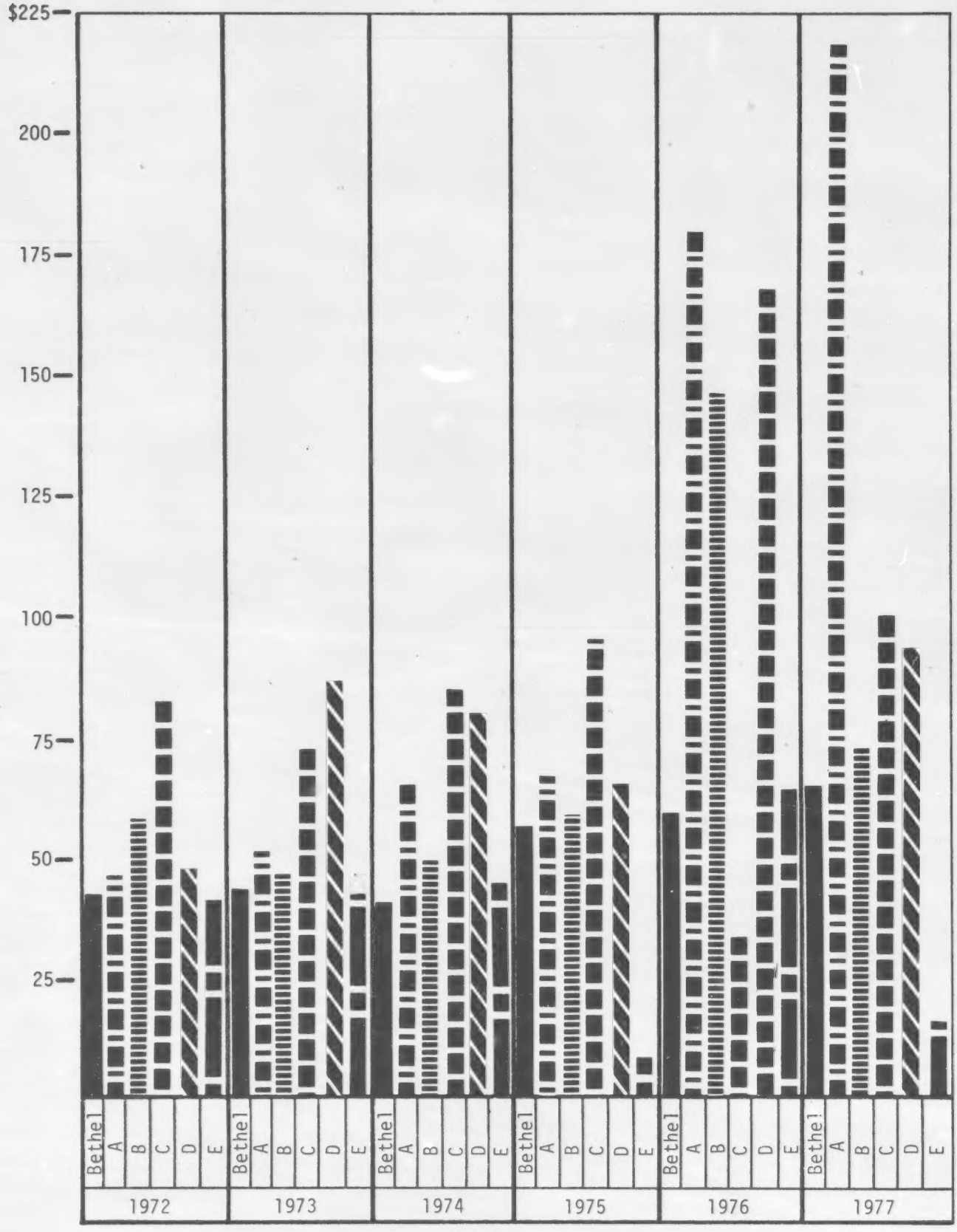
BOOKS/INSTRUCTIONAL MATERIALS

Per Pupil Cost - Object Category #6



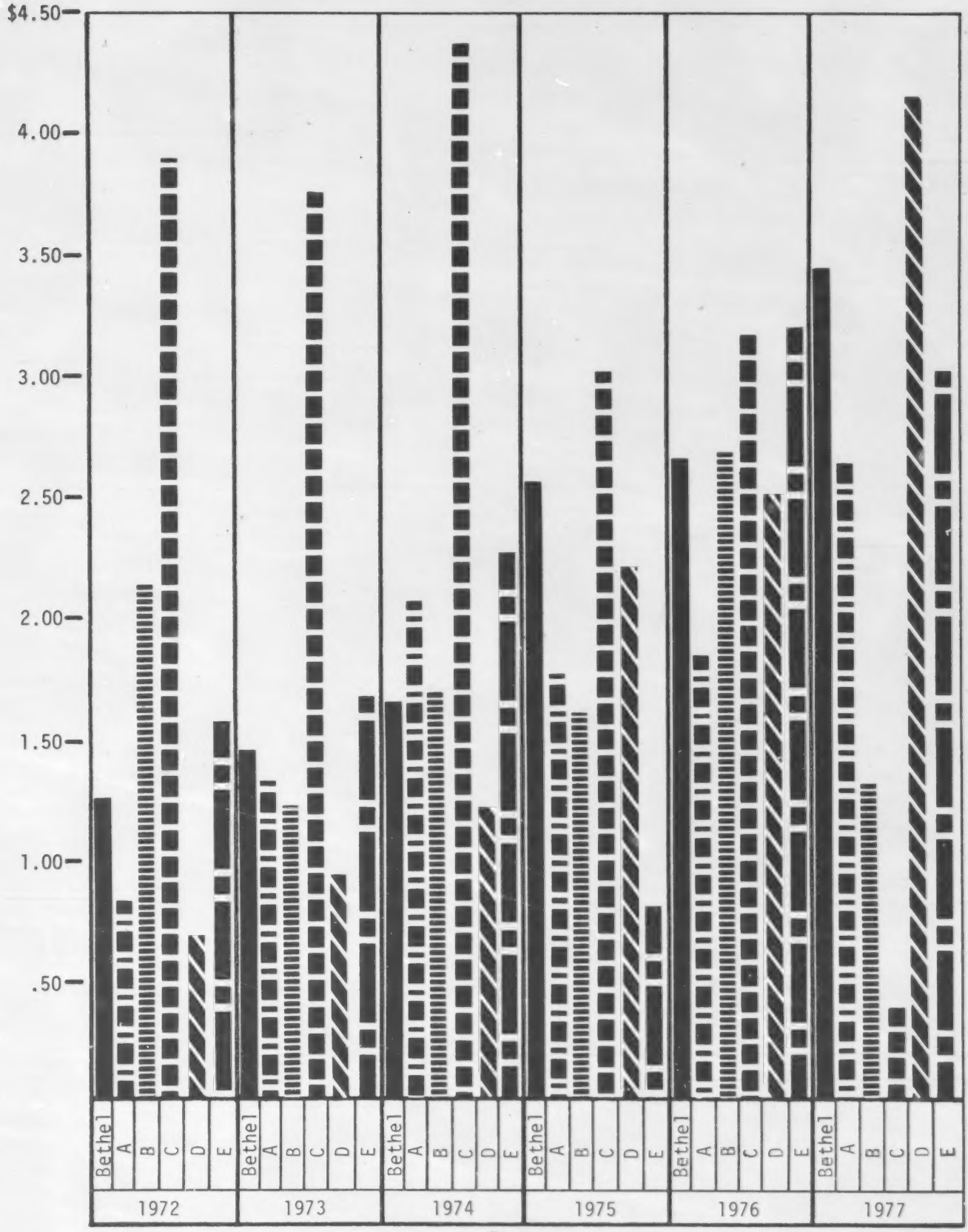
CONTRACTUAL SERVICES

Per Pupil Cost - Object Category #7



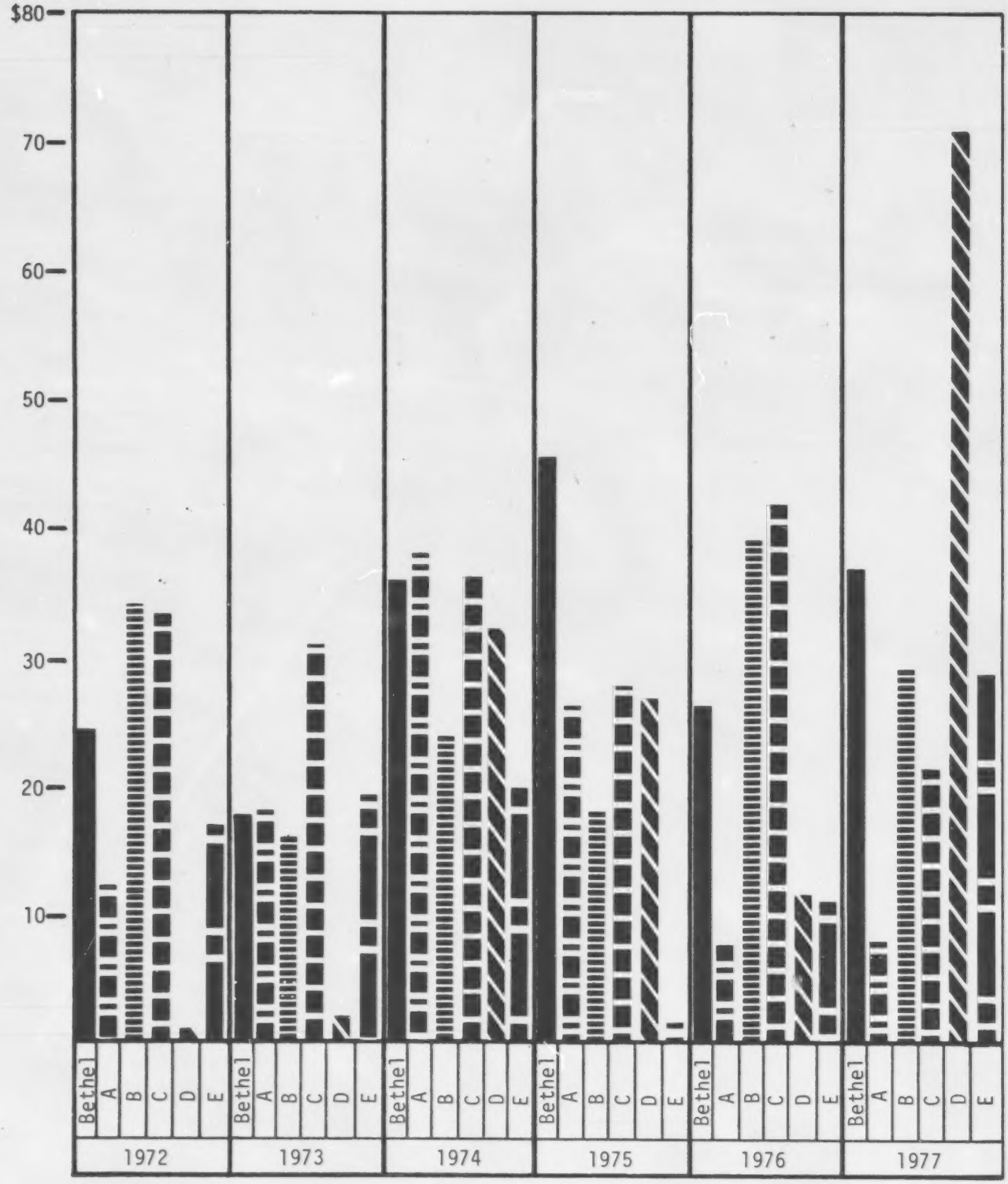
TRAVEL

Per Pupil Cost - Object Category #8



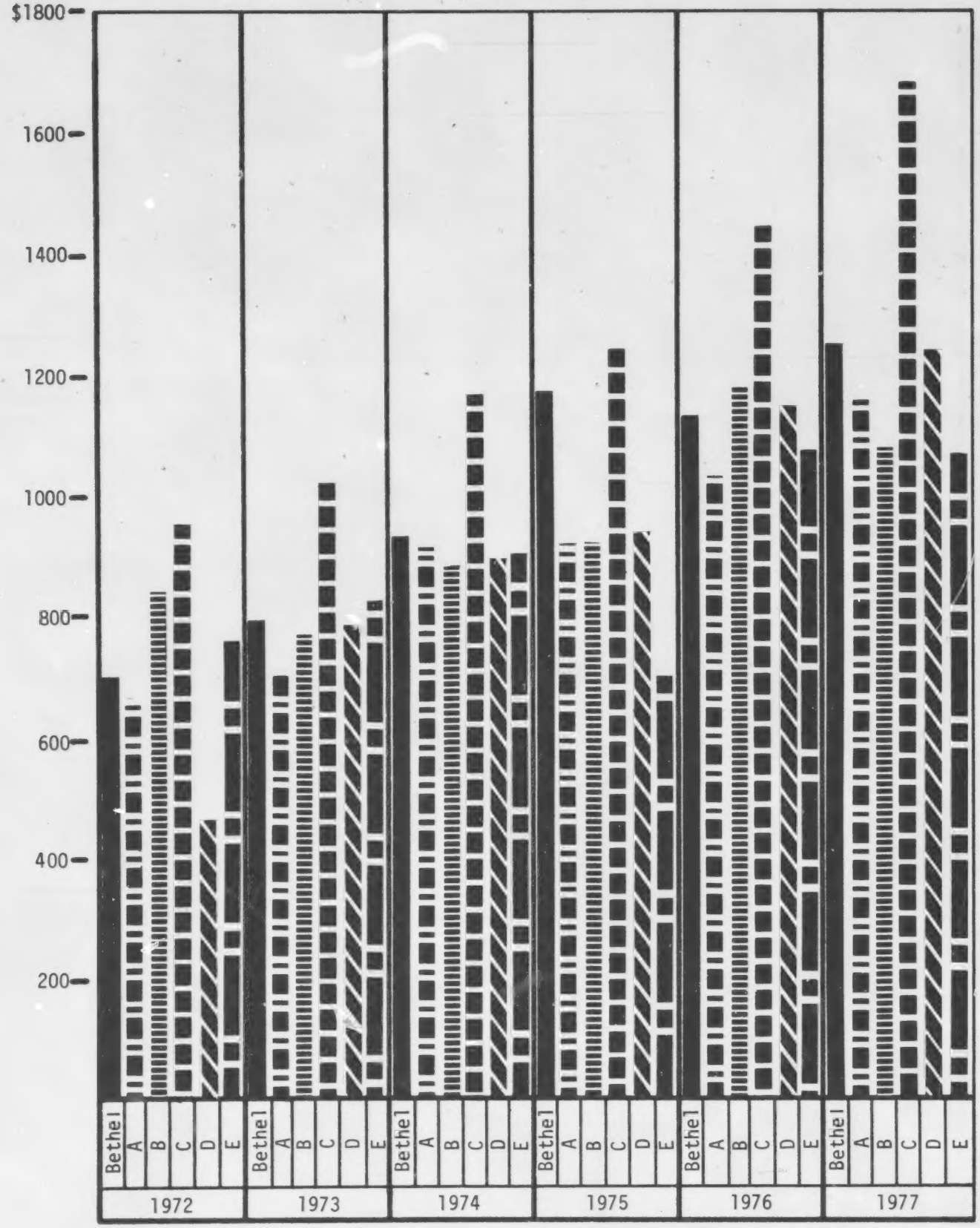
CAPITAL OUTLAY

Per Pupil Cost - Object Category #9



ALL OBJECT CATEGORIES

Per Pupil Cost - Total



As can be seen from the data, there is no sufficient trend to support a contention that Bethel is different from the districts in the control group. To summarize the data from the use of Model I, Table Six lists the number of districts that spent either more per pupil, or less per pupil, than Bethel.

TABLE SIX

THE NUMBER OF CONTROL DISTRICTS
SPENDING EITHER MORE THAN BETHEL,
OR LESS THAN BETHEL, IN EACH
OBJECT CATEGORY

OBJECT CATEGORY	MORE/LESS PER PUPIL	YEAR					
		1972	1973	1974	1975	1976	1977
1	More per pupil	3	3	4	--	--	--
	Less per pupil	2	2	1	--	--	--
2	More per pupil	0	0	0	1	1	1
	Less per pupil	5	5	5	4	4	4
3	More per pupil	2	2	3	1	2	1
	Less per pupil	3	3	2	4	3	4
4	More per pupil	3	3	3	2	5	1
	Less per pupil	2	2	2	3	0	4
5	More per pupil	2	3	2	2	2	2
	Less per pupil	3	2	3	3	3	3
6	More per pupil	4	2	1	0	4	2
	Less per pupil	1	3	4	5	1	3

TABLE SIX--Continued

OBJECT CATEGORY	MORE/LESS PER PUPIL	YEAR					
		1972	1973	1974	1975	1976	1977
7	More per pupil	5	5	5	4	4	4
	Less per pupil	0	0	0	1	1	1
8	More per pupil	3	2	4	1	3	1
	Less per pupil	2	3	1	4	2	4
9	More per pupil	2	3	2	0	2	1
	Less per pupil	3	2	3	5	3	4
Total	More per pupil	3	2	1	1	3	1
	Less per pupil	2	3	4	4	2	4

Because of the lack of clear cost trends, and because of the methodological limitations of the procedures, there is insufficient support to conclude that Bethel is different from the districts in the control group.

Model II

The second approach used to identify differences in costs involved a simulation of providing service to students in Bethel under the 45/15 schedule and under the traditional schedule. If the district returns to the traditional schedule, decisions will be made regarding the number of schools needed and the levels of service to be provided. Three alternative delivery alternatives were investigated. Table Seven summarizes the next change in annual operations costs that would be incurred if the district were to change from the current 45/15 schedule.

TABLE SEVEN

NET CHANGE IN ANNUAL OPERATIONS
COSTS IF BETHEL WERE TO RETURN
TO THE TRADITIONAL 180-DAY SCHEDULE

COST CATEGORY	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Building Administration Costs	R $34,452	I $22,146	I $86,471
Teacher Costs	NC	NC	NC
Secretarial, Clerk, and Aide Costs	R $27,076	I $6,768	I $17,828
Costs for Instructional Specialists	NC	NC	NC
Food Service Costs	NC	NC	NC
Transportation Costs	R $110,000[a]	R $110,000	R $110,000
Custodial Costs	I $72,784	I $72,784	I $72,784
Maintenance	NDD	NDD	NDD
Library Costs	R $19,203	R $7,290	I $11,326
Utility Costs	NDD	NDD	NDD
Costs for Central Administration	NC	I $47,378	I $47,378
Instructional Support Costs	NC	NC	NC

Key: R=Reduction, I=Increase, NC=No Change, NDD=No Discernable Difference

[a]Transportation savings were calculated based on a reduction of 18% of costs per pupil transported--i.e., $22 X 5,000 students = $110,000.

To determine a total expected change, the sum is calculated for Alternatives A, B, and C. These expected net changes are reported in Table Eight.

TABLE EIGHT

EXPECTED NET CHANGES IN
OPERATIONS COSTS WHEN
RETURNING TO A TRADITIONAL SCHEDULE

NET CHANGE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Change	Reduction $117,947	Increase $31,786	Increase $125,757

As can be seen from Table Eight, the difference in operations costs between the 45/15 schedule and the traditional schedule is dependent on the means to provide needed space and service for students. Under Alternative A, the district could reduce operations costs by roughly $120,000. Under Alternative B, there is only a slight difference in costs between the year-round and traditional schedules. Under Alternative C, the district would spend roughly an additional $125,000 to return to the traditional schedule.

Captial Outlay and Related Costs

In addition to changes in annual operations costs, if Bethel were to return to the traditional schedule, certain one-time capital outlay, instructional, and supply costs would be necessary. These costs are estimated below.

When returning to the traditional schedule, new school space would be required at both the elementary and junior high schools. If space is needed

for a total of 1,700 students at the junior high and 3,000 students at the elementary schools and the existing schools are full, then additional space would be needed for roughly 570 students at the junior high and 1,000 students at the elementary schools. Costs to house these students are inflating each year, so estimates are provided below.

Junior high:	570 students
	X 130 square feet per student
	X $55 per square foot
	$4,075,500
Elementary:	1,000 students
	X 90 square feet per student
	X $50 per square foot
	$4,500,000
Equipment, Supplies and Materials (at 10%):	$857,550

In addition to these building related costs, new buses must be purchased. An estimate of 12-15 buses has been identified. Assuming a cost of $60,000 per bus, this expenditure is between $720,000 and $900,000.

The total of these costs is presented in Table Nine.

TABLE NINE

CAPITAL OUTLAY AND RELATED COSTS FOR RETURNING TO THE TRADITIONAL SCHEDULE

New School Space	$ 8,575,500	
Supplies, Materials, and Equipment	857,550	
School Buses	720,000	to 900,000
Total	$10,153,050	to 10,333,050

SECTION V: CONCLUSIONS AND SUGGESTIONS FOR ADDITIONAL RESEARCH

Conclusions

Results have been presented from two models designed to study differences in operations costs between the traditional 180-day school schedule and the 45/15 schedule in the Bethel School District. Using the first approach, labeled Model I in this study, no conclusions were warrented. That is, no differences were determined between Bethel and a control group of five school districts. Using the second approach, labeled Model II in this study, cost differences were found to be related to the alternative used to provide needed school space and services. When returning to the traditional schedule, results ranged from a possible reduction in costs of roughly $120,000 to a possible increase of roughly $125,000. When considering a school district with annual expenditures of $10,000,000, the possible changes are within a range of $\pm$ 1.3%. Capital outlay and related expenditures were found to be approximately $10,200,000.

New Research Needed

Regardless of the possible difference in costs for operating schools, additional questions must be raised regarding the effectiveness of the schedule used by the school system. Questions related to student achievement must be addressed. Questions related to parent and community satisfaction must be addressed. Questions about the satisfaction of teachers and other employees must be addressed. The professional literature includes some reference to each of these questions. One question that has not been raised deals with how effectively is time used under the two schedules. The year-

round schedule is a very complex system to administer. Are principals and central office administrators achieving the same kind of goals with the same level of proficiency under the two schedules? Frederick Taylor, a leading proponent of system efficiency in the early 1900's, would have been interested in a "time and motion" study--a study to determine if people are involved with, and complete, similar tasks when operating under the different schedules. That administrators are spending their time to deal with tasks of some different levels of significance would be an interesting hypothesis to investigate.

APPENDIX A

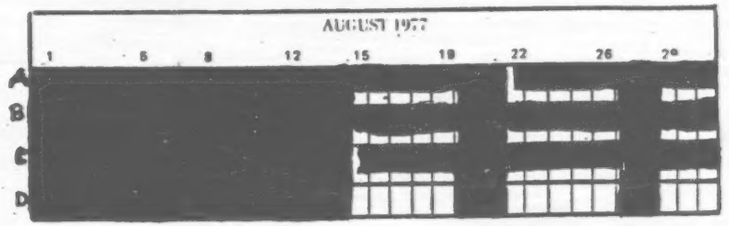
BETHEL SCHOOL DISTRICT

1977 - 1978 CALENDAR

ELEMENTARY AND JUNIOR HIGH

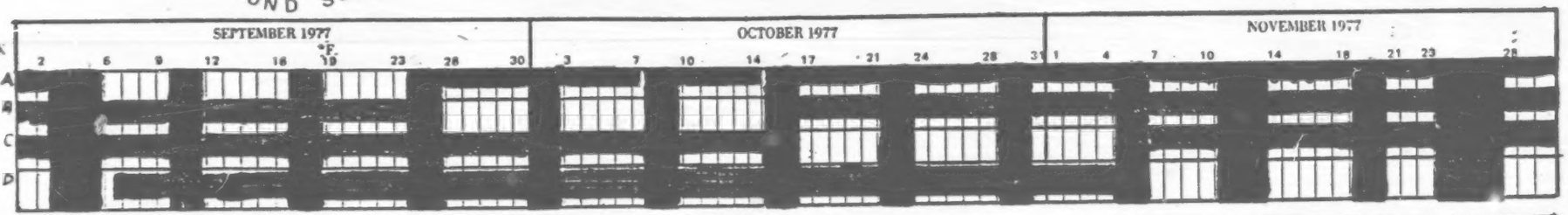
BETHEL

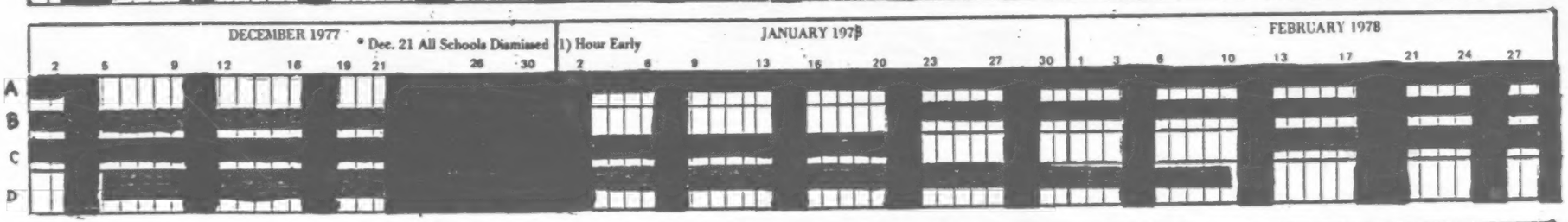
BETHEL SCHOOL DISTRICT No. 403
1977 - 1978 CALENDAR
ELEMENTARY and JUNIOR HIGH

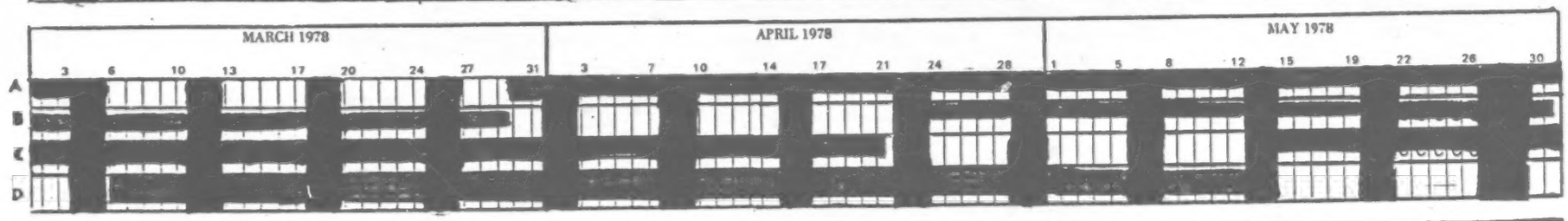


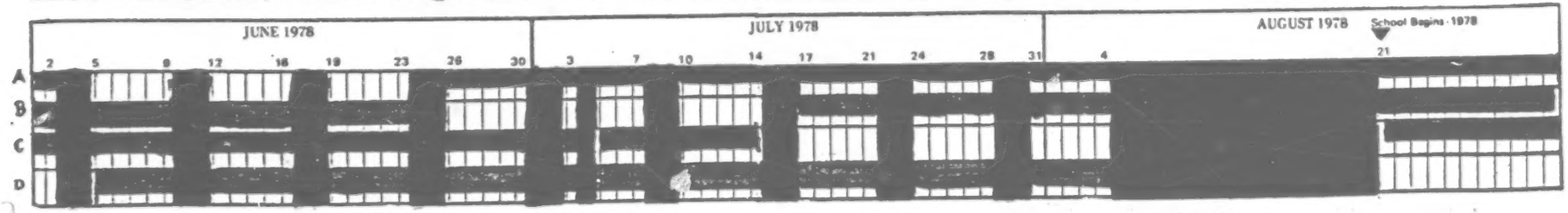
IN-SCHOOL		VACATION
A Track		
Aug. 15-Sept. 2	15	Sept. 6-Sept 23
Sept 26-Dec. 2	47	Dec. 5-Dec. 21
Jan. 3-March 3	43	March 6-March 29
March 30-June 2	46	June 5-June 23
June 26-Aug. 4	29	
	180	
B Track		
Aug 15-Sept 23	29	Sept 26-Oct 14
Oct 17-Dec. 21	45	Jan. 3-Jan. 20
Jan. 23-March 29	47	March 30-April 2
April 24-June 23	44	June 26-July 14
July 17-Aug. 4	15	
	180	
C Track		
Aug. 15-Oct. 14	44	Oct. 17-Nov. 4
Nov. 7-Jan. 20	44	Jan. 23-Feb. 10
Feb. 13-April 21	49	April 24-May 12
May 15-July 14	43	July 17-Aug. 4
	180	
D Track		
Sept. 6-Nov. 4	44	Aug. 15-Sept. 2
Dec. 5-Feb. 10	42	Nov. 7-Dec. 2
March 6-May 12	50	Feb. 13-March 3
June 5-Aug. 4	44	May 15-June 2
	180	

TRACK









Holidays

September 5	--	Labor Day
November 11	--	Veterans Day
November 24	--	Thanksgiving
December 25	--	Christmas
January 1	--	New Year's Day
February 20	--	Presidents Day
May 29	--	Memorial Day
July 4	--	Independence Day

*F – Fair Day –Early Dismissal

All schools will be closed December 22, 1977 thru January 2, 1978.

*C – Conferencing – Early Dismissal

APPENDIX B

DEFINING LEVELS OF SERVICE

Precisely defining levels of service is complex. Under the year-round schedule, a principal serves 240 days; for this illustration assume that he works with a school of 800 students; he would work with 600 during any particular period. If this school were to return to a traditional schedule, the principal would still serve a school of 800 students, so the number of students served during a year would be the same. However, under the traditional schedule, all 800 of the students would be present at the same time, thereby creating additional demand from the principal. This is not equal service from the school principal. The question is, "What would be equal service?" As the schedule changes from the year-round to the traditional, the principal's contract would be shortened, e.g., from 240 days to 210 days.

The dollars saved from this reduced contract could be spent in several ways in an attempt to provide "equal service" to all 800 students: a part-time vice principal, guidance counselor, or student activities coordinator may provide the needed service. Theoretically, the solution lies in spending the same dollars per student to acquire the service needed. Using this criterion there would be absolutely no difference between costs of the year-round and traditional schedules. However, in reality, personnel staffing decisions are seldom made in this way. More typically, a decision would be made to simply hire a part-time vice principal, guidance counselor, or whatever may be deemed appropriate. This staffing decision illustrates that the critical question of costs is related to the specific personnel that are hired when operating under the alternative schedules.

Again, if equal service is defined as spending the same number of dollars per student, then there would be no difference between the schedules. However, using different alternatives to provide the needed educational space, spending the same dollars per student may not be feasible.

This is a district decision and may relate to the varying conditions at the schools throughout the district.

Because of the potential ambiguity in costs for various levels of service, a simulation technique is used in this research. It is anticipated that the three alternative plans to provide the needed space and service actually represent a range within which the "true cost" of returning to a traditional schedule is contained. That is, the costs associated with Alternative A, B, or C may not be the "real" cost of returning to the traditional schedule, but the "real" cost is, somewhere, within the range of costs from Alternative A to Alternative C.

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